We claim:

Sub A1

1. A spiral groove in an optical disk comprising:

a wobble, the wobble being a sinusoidal deviation from the centerline of the groove; and

a first sinusoidal mark located at a zero crossing of the wobble.

2. The groove of Claim 1, wherein the first sinusoidal mark has the same amplitude as the wobble.

3. The groove of Claim 1, wherein the first sinusoidal mark has a frequency greater than the frequency of the wobble.

4. The groove of Claim 3, wherein the first sinusoidal mark has a frequency 3 to 5 times the frequency of the wobble.

5. The groove of Claim 1, further comprising a second sinusoidal mark having a different phase than the first mark.

6. The groove of Claim 1, further comprising a second sinusoidal mark having the same phase as the first sinusoidal mark.

7. The groove of Claim 6, wherein first sinusoidal mark and the second sinusoidal mark are adjacent to each other such that they are aligned in a radial direction.

8. The groove of Claim 1, wherein the zero crossing is a negative zero crossing.

9. The groove of Claim 1, wherein the zero crossing is a positive zero crossing.

10. The groove of Claim 1, further comprising more than one sinusoidal mark in a single cycle of the wobble.

11. A method of storing data on an optical disk, comprising:

Sub A1 Concluded

creating a spiral groove with a sinusoidal deviation from a centerline of the spiral groove on the optical disk, the sinusoidal deviation having a first frequency; and

creating sinusoidal marks in zero crossings of the spiral groove, the sinusoidal marks having a second frequency.

12. The method of Claim 11, wherein the first frequency is less than the second frequency.

13. The method of Claim 11, wherein said creating sinusoidal marks comprises inserting a sinusoidal mark in a zero crossing to indicate an active bit.

14. The method of Claim 13, wherein the zero crossings are positive zero crossings.

15. The method of Claim 13, wherein the zero crossings are negative zero crossings.

16. The method of Claim 11, wherein said creating sinusoidal marks comprises generating sinusoidal marks in phase.

17. The method of Claim 11, wherein said creating sinusoidal marks comprises generating more than one sinusoidal mark in one wobble cycle.

Sub A2

18. The method of Claim 11, where in said creating sinusoidal marks comprises:

receiving data bits;

encoding data bits to code bits according to an encoding scheme; and

generating sinusoidal marks in wobble cycles to represent code bits.

19. The method of claim 11, wherein the sinusoidal mark has the same amplitude as the sinusoidal deviation.

Sub A3

20. A method for reading information on an optical disk, comprising:

Sub A3 concluded

detecting zero crossings of a wobble on the optical disk;

detecting sinusoidal marks in the wobble;

outputting an inactive bit upon detecting a wobble cycle and not the sinusoidal mark; and

outputting an active bit upon detecting a sinusoidal mark.

21. The method of Claim 20, further comprising detecting a synchronization mark of a sector on the optical disk from the inactive bits and the active bits, wherein a predetermined sequence of inactive bits and active bits identifies the synchronization mark.

22. The method of Claim 20, wherein the zero crossings are positive zero crossings.

23. The method of Claim 20, wherein the zero crossings are negative zero crossings.

Sub A4

24. The method of Claim 20, further comprising detecting physical sector information for a sector from the inactive bits and the active bits.

25. The method of Claim 24, wherein the physical sector information includes a physical sector address.

Sub A5

26. The method of Claim 20, further comprising detecting an error detection code from the inactive bits and the active bits.

27. An optical drive comprising:

a matched filter;

a wobble detector; and

a bit detector coupled to a first output line of the matched filter and a second output line of the wobble detector.

28. The optical drive of Claim 27, wherein the bit detector comprises:

a first flip-flop comprising:

a first clock input terminal coupled to the first output line;

a third output line; and

a reset terminal;

a second flip-flop comprising:

a first data input terminal coupled to the third output line;

a second clock input terminal coupled to the second output line;

a delay buffer coupled to the second output line and the reset terminal.

29. The optical drive of Claim 28, wherein the first flip-flop further comprises a second data input terminal coupled to an active signal.

30. The optical drive of Claim 27, further comprising a memory coupled a fourth output line of the bit detector.

31. The optical drive of Claim 27, further comprising a synchronization mark detector.

Sub A6

32. A method for reading information on an optical disk, comprising:

determining a wobble frequency of a wobble;

detecting sinusoidal marks in the wobble according to the wobble frequency;

Sub A6 concluded

outputting an active bit upon detecting the sinusoidal mark; and

outputting an inactive bit when the sinusoidal mark is not detected.

33. The method of Claim 32, further comprising detecting a synchronization mark from the active bits and the inactive bits.

Rule 1.126 34 ~~33~~. The method of Claim 32, further comprising detecting physical sector information for a sector from the active bits and the inactive bits.

Rule 1.126 35 ~~34~~. The method of Claim 32, further comprising detecting an error correction code from the active bits and the inactive bits.

ADD A7